



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,655	05/04/2001	Albert Sicignano		7254

7590 11/30/2004
Ilya Zborovsky
6 Schoolhouse Way
Dix Hills, NY 11746

EXAMINER

ROSARIO-VASQUEZ, DENNIS

ART UNIT PAPER NUMBER

2621

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/848,655

Applicant(s)

SICIGNANO ET AL.

Examiner

Dennis Rosario-Vasquez

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. The amendment was received on 9/13/04 and entered. Claims 1-13 are pending.

Specification

2. Due to the amendment the objection to the specification is withdrawn.

Response to Arguments

3. Applicant's arguments filed 9/13/04, pages 2 and 3 with regard to claim 1 of the REMARKS section have been fully considered but they are not persuasive. Koitabashi et al. (US Patent 5,640,243 A) addresses the limitations of claim 1 as shown below.

4. Applicant's arguments filed 9/13/04, pages 3 and 4 with regard to claims 12 and 13 of the REMARKS section have been fully considered but they are not persuasive. Koitabashi et al. (US Patent 5,640,243 A) addresses the limitations of claims 12 and 13 as shown below.

Claim Objections

5. The following quotations of 37 CFR § 1.75(a) is the basis of objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

6. Claims 5 and 11 are objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery.

Art Unit: 2621

7. Claim 5, lines 2,3 states "...the centers of the features is performed in two mutually perpendicular directions." And ought to be amended to "...the centers of the features is **determined** in two mutually perpendicular directions." Presently claim 5 does not make sense with "performed" in line 2 of claim 5.
8. Claim 11, line 2:"comprisign" ought to be amended to "comprising".

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-10,12,13 are rejected under 35 U.S.C. 102(b) as being anticipated by Koitabashi et al. (US Patent 5,640,243 A).

Regarding claim 1, Koitabashi et al. discloses a method of quantitative determination of an image drift ("drift... is taken into account (col. 6, lines 56,57).") in a digital imaging microscope, comprising the steps of:

- a) using a pattern (fig. 3A has 5 features arranged in a square pattern with a feature in the center of the square.) which has a plurality of features (Fig. 3A, i1-i4 are 4 of the above features.) spaced from one another (using "Xpt" and "Ypt" coordinates of figure 3A.) into mutually perpendicular directions (Fig. 3, features i1 and i2 are perpendicular to features i3 and i4.);

Art Unit: 2621

b) producing a set of images $((x_l, y_l))$ and (x_r, y_r) are two images of the pattern that contains the features in col. 7, lines 1-9.) of the pattern (fig. 3A has 5 features arranged in a square pattern with a feature in the center of the square.) with certain time intervals therebetween $((x_l, y_l))$ and (x_r, y_r) are two images of the pattern with associated "time" in col. 7, lines 5,6,8 and 9.); and

c) determining an offset ("rotation" correction in col. 6, line 64 is performed to determine an offset R using equation 5 in column 7.) of each of the features (Fig. 3A, i1-i4 are 4 of the above features.) in the set of the thusly obtained images $((x_l, y_l))$ and (x_r, y_r) are two images of the pattern that contains the features in col. 7, lines 1-9.) as an image drift (The features of fig. 3A, i1-i4 or "indication mark images" in col. 5, line 26 are used to take "into account" image "drift" in col. 6, lines 53-57. Thus a rotation correction is performed with image drift taken into account.);

d) using the pattern (fig. 3A has 5 features arranged in a square pattern with a feature in the center of the square.) which includes four said features (Fig. 3A, i1-i4 are 4 of the above features.), with two of the features (Fig. 3, features i1 and i2) spaced in one direction (Fig. 3A, features i1 and i2 are spaced horizontally.) and two of the features (Features i3 and i4 of figure 3A.) spaced in a perpendicular direction (Features i3 and i4 of figure 3A are spaced in a vertical direction and perpendicular to the horizontal direction of features i1 and i2.); and

Art Unit: 2621

e) determining (Pattern matching is performed using centers of features.) a center of each feature (Fig. 3A has a center iR1-iR4 for each respective feature i1-i4.), said determining an offset ("rotation" correction in col. 6, line 64 is performed to determine an offset R using equation 5 in column 7.) including determining an offset ("x_m" and "y_m" are "displacement[s]... between the centers of the indication mark images [or i1-i4 of figure 3A]... (col. 6, lines 4,5).") of said center of each of said four features (Fig. 3A has a center iR1-iR4 for each respective feature i1-i4.) in said set of images ((x_i,y_i) and (x_r, y_r) are two images of the pattern that contains the features in col. 7, lines 1-9.) of said pattern (fig. 3A has 5 features arranged in a square pattern with a feature in the center of the square.).

Regarding claim 5, Koitabashi et al. discloses a method as defined in claim 1, wherein said determining an offset ("x_m" and "y_m" are "displacement[s]... between the centers of the indication mark images [or i1-i4 of figure 3A]... (col. 6, lines 4,5).") the centers of the features (Fig. 3A has a center iR1-iR4 for each respective feature i1-i4.) is [performed] **determined** in two mutually perpendicular directions (horizontal "x_m" and vertical "y_m" directions.)

Regarding claim 7, Koitabashi et al. discloses a method as defined in claim 1; and further comprising

a) providing a plurality of patterns (The images of figure 3A, i1-i4 can be an arbitrary figures or circles as mentioned in col. 4, lines 59-62. Thus the images of figure 3A, i1-i4 can be made of rectangles or squares.) which are different from one another by at least one parameter selected from the group consisting of a size (radius of the circle in col. 4, line 61.) of each feature (circle) and a magnitude of a space between the features, and

b) selecting a pattern (A arbitrary pattern suggests a selection of a pattern.) in correspondence with a size range (The arbitrary pattern could contain circles with a designated radius.) of measurements to be performed by a scanning electron microscope (figure 1, num. 15 is a microscope in col. 4, line 3 that performs measurements on image 3A or indicator plate 17 in col. 4, lines 6-11 where indicator marks i1-i4 are shown.)

Claim 8 is similar to claim 7 except for the limitation of:

a) selecting a pattern (A arbitrary pattern suggests a selection of a pattern.) in correspondence of a drift (The pattern selected of indication marks i1-i4 are used to take drift into account in col. 6, lines 54-57.) acceptable by a user of the scanning electron microscope (The indicator marks are used to "eliminate the influence of this drift (col. 6, lines 57,58)" for observing in col. 3, line 44.).

Regarding claim 9, Koitabashi et al. discloses a method as defined in claim 1; and further comprising a step of representing the thusly determined image drift ("drift... is taken into account (col. 6, lines 56,57).") graphically on a display screen (A computer using a video signal in col. 4, lines 23-28.).

Regarding claim 10, Koitabashi et al. discloses a method as defined in claim 1; and further comprising representing the thusly determined image drift ("drift... is taken into account (col. 6, lines 56,57).") in a digital form (A computer is used with a video signal "to control the entire projection exposure apparatus (col. 4, lines 25-28).").

Claim 12 is similar to claim 1 except for the limitation disclosed by Koitabashi et al. of said determining an offset (" x_m " and " y_m " are "displacement[s]... between the centers of the indication mark images [or i1-i4 of figure 3A]...(col. 6, lines 4,5).") includes also determining (Pattern matching is performed using centers of features.) central point (fig. 3A, label: FM) between said centers of said features (Fig. 3A has a center iR1-iR4 for each respective feature i1-i4.), said determining of an offset (" x_m " and " y_m " are "displacement[s]... between the centers of the indication mark images [or i1-i4 of figure 3A]...(col. 6, lines 4,5).") includes determining an offset ("rotation" correction in col. 6, line 64 is performed to determine an offset R using equation 5 in column 7.) of said central points (Fig. 3A has a center iR1-iR4 for each respective feature i1-i4.) in said set of images ((x_i, y_i) and (x_r, y_r) are two images of the pattern that contains the features i1-i4 and FM in col. 7, lines 1-9.).

Claim 13 has been addressed in claim 1.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koitabashi et al. (US Patent 5,640,243 A) in view of Elings et al. (US Patent 5,077,473 A).

Regarding claim 11, Koitabashi et al. does not teach the limitation of claim 11, but does eliminate image drift in col. 6, lines 57,58 for metrology purposes.

However, Elings et al. discloses a method further [comprisign] **comprising** :

a) comparing determined drift ("Forward" and "reverse" signals are compared to form a "supplemental signal...to compensate for "drift" in a "preceding frame" in col. 6, lines 1-11. Thus, drift was determined in a preceding frame and will be compensated for using the supplemental signal.) with a predetermined image drift threshold (The forward and reverse signals are compared until they are aligned in col. 8, lines 49-53.); and

b) providing an answer (The aligning of the forward and reverse signals "indicat[es] that... drift is compensated... in col. 8, lines 49-53.) whether a scanning electron microscope with the thusly determined drift ("Forward" and "reverse" signals are compared to form a "supplemental signal...to compensate for "drift" in a "preceding frame" in col. 6, lines 1-11. Thus, drift was determined in a preceding frame and will be

Art Unit: 2621

compensated for using the supplemental signal.) can be utilized or not for metrology purposes.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Koitabashi et al.'s teaching of eliminating image drift with Elings et al. teaching of compensating for drift, because, Elings et al.'s teaching "remove[s] drift in the image and, therefore, increase the utility of the instrument and reduce measurement time (col. 11, lines 32-35)."

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario-Vasquez whose telephone number is 703-305-5431. The examiner can normally be reached on 9-5.

Art Unit: 2621

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DRV

Dennis Rosario-Vasquez
Unit 2621


DANIEL MIRIAM
PRIMARY EXAMINER